

Patent Application Number: 10/644,472

**REMARKS**

Claims 1, 3-5, 8-10, 16, 17, 19-21, 24-26, and 32 are pending in the present application. Claims 2, 6, 7, 11-15, 18, 22, 23, and 27-31 have been cancelled without prejudice or disclaimer to the subject matter contained therein.

**A. Rejection under 35 U.S.C. §102(b)**

Claims 1-4, 6-8, 12, 16-20, 22-24, 28, and 32 have been rejected under 35 U.S.C. §102(b) as being anticipated by Ostromoukhov (US-A-5,923,774). This rejection under 35 U.S.C. §102(b) over Ostromoukhov is respectfully traversed.

In formulating the rejection under 35 U.S.C. §102(b), the Examiner alleges that Ostromoukhov teaches receiving a pixel possessing color values from an input image; receiving a plurality of information bits to be encoded at a corresponding pixel in an output image; selecting one of at least two different GCR functions where the selection is based on the state of said received information bits; generating CMYK values using said selected GCR function and said color values; and assigning said CMYK values to said corresponding pixel in said output image. These positions and conclusion by the Examiner is respectfully traversed in view of the above amendments.

In contrast, the presently claimed invention, as set forth in amended independent claim 1, is directed to an encoding method for digital watermarking in a calibrated printing path that receives a pixel having cyan, magenta, and yellow color values representing an input image; receives, for each received pixel having cyan, magenta, and yellow color values representing an input image, a plurality of information bits, the plurality of information bits representing data to be encoded at a corresponding pixel in an output image; selects a gray component replacement function from a predetermined number of different gray component replacement functions, for each received pixel, based upon the received information bits for the received pixel; generates cyan, magenta, yellow and black output values for the received pixel using the selected gray component replacement function and the cyan, magenta, and yellow color values of the received pixel, the generated black output value representing the data to be encoded at the corresponding pixel in the output image; and assigns the cyan, magenta, yellow and black output values to the corresponding pixel in the output image.

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Moreover, the presently claimed invention, as set forth in amended independent claim 16, is directed to an encoding method for digital watermarking in a calibrated printing path that receives a pixel having color values representing an input image; receives, for each received pixel having color values representing an input image, a plurality of information bits, the plurality of information bits representing data to be encoded at a corresponding pixel in an output image; selects, for each received pixel, a mapping function from a predetermined number of mapping functions, the mapping functions map input color values to output colorant values, based upon the received information bits for the received pixel; generates output colorant values for the received pixel using the selected mapping function and the color values of the received pixel, one of the output colorant values representing the data to be encoded at the corresponding pixel in the output image; and assigns the output colorant values to the corresponding pixel in the output image.

Furthermore, the presently claimed invention, as set forth in amended independent claim 17, is directed to a system for encoding a digital watermark in a calibrated printing path. The system includes an image processing circuit and a device for rendering an output image. The image processing circuit receives a pixel having cyan, magenta, and yellow color values representing an input image; receives, for each received pixel having cyan, magenta, and yellow color values representing an input image, a plurality of information bits, the plurality of information bits representing data to be encoded at a corresponding pixel in an output image; selects a gray component replacement function from a predetermined number of different gray component replacement functions, for each received pixel, based upon the received information bits for the received pixel; generates cyan, magenta, yellow and black output values for the received pixel using the selected gray component replacement function and the cyan, magenta, and yellow color values of the received pixel, the generated black output value representing the data to be encoded at the corresponding pixel in the output image; and assigns the cyan, magenta, yellow and black output values to the corresponding pixel in the output image. The device renders the assigned cyan, magenta, yellow and black output values as the output image.

Lastly, the presently claimed invention, as set forth in amended independent claim 32, is directed to a system for encoding a digital watermark in a calibrated printing path. The system includes an image processing circuit and a device for rendering an output image. The image processing circuit receives a pixel having color values representing an input image; receives, for

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each received pixel having color values representing an input image, a plurality of information bits, the plurality of information bits representing data to be encoded at a corresponding pixel in an output image; selects, for each received pixel, a mapping function from a predetermined number of mapping functions, the mapping functions map input color values to output colorant values, based upon the received information bits for the received pixel; generates output colorant values for the received pixel using the selected mapping function and the color values of the received pixel, one of the output colorant values representing the data to be encoded at the corresponding pixel in the output image; and assigns the output colorant values to the corresponding pixel in the output image. The device renders the assigned output colorant values as the output image.

As clearly set forth above, the presently claimed invention, as set forth in amended independent claims 1 and 17, recites the selection of a gray component replacement function from a predetermined number of different gray component replacement functions, for each received pixel, based upon the received information bits for the received pixel and the generation of cyan, magenta, yellow and black output values for the received pixel using the selected gray component replacement function and the cyan, magenta, and yellow color values of the received pixel, the generated black output value representing the data to be encoded at the corresponding pixel in the output image.

On the other hand, Ostromoukhov teaches that a rendering path is selected based upon the image to be printed (column 7, lines 4-30). Moreover, Ostromoukhov teaches that the gray replacement component functions are selected based upon the continuous tone cyan, magenta, and yellow values (column 8, line 41 to column 9, line 36 and Figure 9).

In other words, Ostromoukhov fails to teach that the selection of a gray component replacement function from a predetermined number of different gray component replacement functions, for each received pixel, is based upon the received information bits for the received pixel, as set forth in amended independent claims 1 and 17. Moreover, Ostromoukhov fails to teach that the generated black output value represents the data to be encoded at the corresponding pixel in the output image, as set forth in amended independent claims 1 and 17.

The presently claimed invention, as set forth in amended independent claims 16 and 32, recites the selection of a mapping function from a predetermined number of different mapping functions, for each received pixel, based upon the received information bits for the received pixel

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and the generation of output colorant values for the received pixel using the selected mapping function and the color values of the received pixel, one of the output colorant values representing the data to be encoded at the corresponding pixel in the output image.

As noted above, Ostromoukhov teaches that a rendering path is selected based upon the image to be printed (column 7, lines 4-30). Moreover, Ostromoukhov teaches that the gray replacement component functions are selected based upon the continuous tone cyan, magenta, and yellow values (column 8, line 41 to column 9, line 36 and Figure 9).

In other words, Ostromoukhov fails to teach that the selection of a mapping function from a predetermined number of different mapping functions, for each received pixel, is based upon the received information bits for the received pixel, as set forth in amended independent claims 16 and 32. Moreover, Ostromoukhov fails to teach that one of the output colorant values representing the data to be encoded at the corresponding pixel in the output image, as set forth in amended independent claims 16 and 32.

With respect to dependent claims 3-4, 8, 12, 19, 20, and 24, the Applicant, for the sake of brevity, will not address the reasons supporting patentability for these dependent claims, as these claims depend directly from allowable independent claims 1 and 17. The Applicant reserves the right to address the patentability of these dependent claims at a later time, should it be necessary.

Accordingly, in view of the amendments and remarks set forth above, the Examiner is respectfully requested to reconsider and withdraw the rejection under 35 U.S.C. §102(b).

**B. Rejection under 35 U.S.C. §103**

Claims 9 and 25 have been rejected under 35 U.S.C. §103 as being unpatentable over Ostromoukhov (US-A-5,923,774) in view of Loce et al. (US-A-6,643,030). This rejection under 35 U.S.C. §103 over Ostromoukhov in view of Loce et al. is respectfully traversed.

With respect to dependent claims 9 and 25, the Applicant, for the sake of brevity, will not address the reasons supporting patentability for these dependent claims, as these claim depend directly from allowable independent claims 1 and 17, respectively. The Applicant reserves the right to address the patentability of these dependent claims at a later time, should it be necessary.

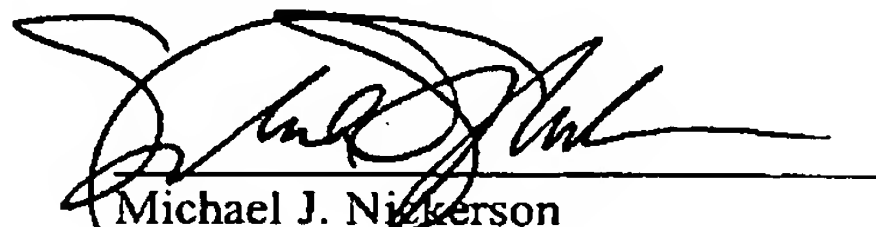
Accordingly, in view of the remarks set forth above, the Examiner is respectfully requested to reconsider and withdraw the rejection under 35 U.S.C. §103.

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**CONCLUSION**

Accordingly, in view of all the reasons set forth above, the Examiner is respectfully requested to reconsider and withdraw the present rejection. Also, an early indication of allowability is earnestly solicited.

Respectfully submitted,



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